

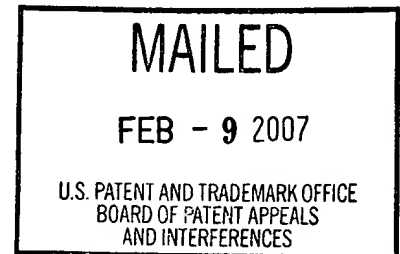
The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KEVIN J. YOUNGERS

Appeal No. 2006-3077
Application 09/911,912
Technology Center 2600



Decided: February 9, 2007

Before RUGGIERO, MACDONALD, and HOMERE, *Administrative Patent Judges*.

HOMERE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals from the Examiner's final rejection of claims 1 through 18 pursuant to 35 U.S.C. § 134. The Examiner indicated that claim 19 contains allowable subject matter. We have jurisdiction under 35 U.S.C. § 6(b) to decide this appeal.

We reverse.

Invention

Appellant invented a method and system for adjusting color image data in a processed array of pixels. The invention uses a scanner that includes: (1) a photo-sensor array to convert the image data into an electrical signal, (2) an A-to-D converter to convert the electrical signal into raw digital data, and (3) a tone map to transform the raw digital data into corrected digital data. Particularly, after scanning an image, each resulting color component of the pixel (raw image data) is examined to determine whether it needs adjusting. If the raw image data falls below the lower end of a predetermined threshold interval, the raw image data belongs to the dark area of the image, and it is preserved. If the raw image data falls above the upper end of the predetermined threshold interval, the raw image belongs in the light area of the image, and a tone map is selectively applied to the raw image data to create a corrected image data. If, however, the raw image data falls between the lower and upper ends of the predetermined threshold interval, the raw image data is modified by interpolating between mid range values to smooth the transitions between adjacent pixels in dark and light areas of the image.

Claims 12 and 13 are illustrative and representative of the claimed invention. They read as follows:

12. A scanner, comprising:

A photo-sensor array for converting an image into an electrical signal;
an A-to-D converter to convert the electrical signal into raw digital data;

a tone map for transforming the raw digital data into corrected digital data;

the scanner configured to output the raw digital data when the raw digital data is below a first pre-selected threshold, to output the corrected digital data when the raw digital data is greater than a second pre-selected value, and to output digital data that is interpolated between the raw digital data and the corrected digital data when the raw digital data is between the two thresholds.

13. A method of processing data contained in an array of pixels, comprising:

defining a threshold;

defining a range around the threshold, the range having a top end and a bottom end;

defining a tone map;

(a) reading a color component of a pixel;

(b) applying the tone map to the color component when the color component is above the top of the high end;

(c) modifying the color component by interpolation when the color component is below the top end of the high range and above the bottom end of the low range, and; otherwise preserving the color component.

References

The Examiner relies on the following references:

Kishida	US 5,287,418	Feb. 15, 1994
Hieda	US 5,481,317	Jan. 02, 1996
Wu	US 5,959,693	Sep. 28, 1999
Sugimoto	US 6,215,529 B1	Apr. 10, 2001
Ishikawa	US 6,636,229 B2	Oct. 21, 2003 (filed Mar. 09, 2001)
Farnung	US 6,753,987 B1	Jun. 22, 2004 (filed Feb. 25, 2000)

Rejections at Issue

- A. Claims 5 through 9 stand rejected under 35 U.S.C. § 102 (e) as being anticipated by Farnung.
- B. Claims 10 and 11 stand rejected under 35 U.S.C. § 103 as being unpatentable over Farnung.
- C. Claims 1 through 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Sugimoto and Wu.
- D. Claims 17 and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Hieda, Sugimoto and Wu.

E. Claim 12 stands rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Farnung, Kishida and Hieda.

F. Claims 13 through 15 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Farnung and Kishida.

G. Claim 16 stands rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Farnung, Kishida and Ishikawa.

Rather than reiterate the arguments of Appellant and the Examiner, the opinion refers to respective details in the Brief¹ and the Examiner's Answer.² This decision considers only those arguments submitted in the Brief. Arguments that Appellant could have made but chose not to make in the Brief are deemed to have been waived. *See* 37 C.F.R. § 41.37(c)(1) (vii)(eff. Sept. 13, 2004). *See also In re Watts*, 354 F.3d 1362, 1368, 69 USPQ2d 1453, 1458 (Fed. Cir. 2004).

OPINION

After considering the entire record before us, we do not agree with the Examiner that claims 5 through 9 are properly rejected under 35 U.S.C. § 102 as being anticipated by Farnung. We also do not agree with the Examiner that claims 10 through 16 are properly rejected under

¹ Appellant filed a corrected Appeal Brief on Aug. 29, 2005.

² The Examiner mailed an Examiner's Answer on Dec. 2, 2005.

35 U.S.C. § 103 as being unpatentable over Farnung taken alone or in various combinations with Kishida, Hieda or Ishikawa. Additionally, we do not agree with the Examiner that claims 1 through 4, 17 and 18 are properly rejected under 35 U.S.C. § 103 as being unpatentable over various combinations of Sugimoto, Wu and Hieda. Accordingly, we reverse the Examiner's rejections of claims 1 through 18 for the reasons set forth **infra**.

I. Under 35 U.S.C. § 102(e), is the Rejection of Claims 5 through 9 as Being Anticipated By Farnung Proper?

To make a prima facie case of anticipation of a claim under 35 U.S.C. § 102, the Examiner must show that the prior art reference relied upon discloses every element of the claim. *See In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986) and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984).

Appellant argues that Farnung does not anticipate claim 5. Particularly, Appellant contends that Farnung does not disclose the step of modifying the color component of a pixel to smooth the transition between color components of adjacent pixels. (Brief, pages 7 and 8).

To determine whether Farnung anticipates claim 5, we must first determine the scope of the claim. We note that claim 5 reads in part as follows:

[M]odifying the color component of the pixel to smooth the transition between color components of adjacent pixels.

We note at page 6, Appellant's specification states the following:

A sharp transition between output pixels that are tone mapped and output pixels that are in the dark areas may create image artifacts. It may be desirable to blend or smooth the transition between the dark area pixels and the pixels modified by the tone map (see figure 3). When a color component is in a light area of the image (304) the tone map is used (306). If the color component is in a transition area (308) the color component may be blended or smoothed (310). When the color component is in a dark area of the image the raw color component may be used (312). There are many ways to define which color components are in a transition area.

Thus, representative claim 1 does require that the color component of a pixel be modified to smooth the transition between color components of adjacent pixels.³

³ We note that the Examiner's rejection improperly omitted this limitation from the claim. Even under a reasonably broad construction of claim 5, the cited limitation would be given patentable weight. We therefore interpret the claim as follows: the color component of the pixel would be (1) transformed if the pixel is greater than the lower threshold, (2) preserved if the pixel is less than the upper threshold, (3) modified if the pixel falls outside of the upper and lower thresholds.

Now, the question before us is what Farnung would have taught to one of ordinary skill in the art? To answer this question, we find the following facts:

1. At column 8, lines 26 through 67, Farnung states the following:

In particular, and as illustrated in FIG. 12, it is possible to have the minimum point 700 and the maximum point 720 moved proportionally with brightness changes in the midpoint 710. This allows very dark and very light values to change proportional to changes in brightness.

Alternatively, and with reference to FIG. 13, the minimum point 700 and the maximum point 720 can be fixed at (0, 0) and (100, 100), respectively, and two new fixed points, the lower offset point 730 and the upper offset point 740 added. The lower offset point 730 could be placed between the minimum point 700 and the midpoint 710 at a location determined by the system curve's black point, i.e., the point at which all values below it are at the darkest output level. The upper offset point 740 can be placed between the midpoint 710 and the maximum point 720 at a location determined by the system curve's white point, i.e., the point at which all values above it are at the brightest output level. The resulting tone reproduction curve would be 1:1 between the minimum point and the lower offset point 730, and between the upper offset point 740 and the maximum point 720 causing the corresponding values from the system curve to be preserved during cascading. This method allows for adjustments to affect only the mid range value between the lower offset point 730 and the upper offset point 740 in an image preserved darker and lighter values.

Furthermore, and with reference to FIG. 14, the minimum point 700 and maximum point 720 can be fixed, and one new upper offset point 750 added. The manipulation of the upper offset point 750, as discussed in relation to the manipulation of the upper offset point 740 described in relation to FIG. 13 allows for the lighter values in an image to be preserved, but causes darker values, excluding absolute

black, to be adjusted. It is to be further appreciated a similar arrangement could be made with only a lower offset point and no upper offset point. This would result in darker values in an image to be preserved, but causing lighter values, excluding absolute white, would be adjusted.

With the above discussion in mind, we find that one of ordinary skill in the art would not have found that Farnung teaches the invention, as recited in claim 5. Farnung discloses a method and system for determining the contrast and brightness of an adjusted tone reproduction curve. Particularly, Farnung discloses a lower and upper offset points, indicating respectively darker and lighter values on the reproduction curve. Farnung further discloses modifying the reproduction curve by placing additional pixel component values ranging between the lower and upper offset points of the curve.

We find that one of ordinary skill in the art, at the time of the present invention, would have readily recognized that Farnung's teachings do not extend to modifying the reproduction curve by placing pixel values outside of the lower and upper offset points on the curve. Consequently, the ordinarily skilled artisan would have aptly appreciated, as did the Examiner, that Farnung does not teach the step of "otherwise modifying the color

component of the pixel to smooth the transition between color components of adjacent pixel,” as recited in claim 5. Therefore, the Examiner erred in concluding that Farnung anticipates claims 5 through 9 even after recognizing that Farnung does not teach the cited step.

After considering the entire record before us, we conclude that the evidence relied upon and the level of skill in the particular art would not have suggested to the ordinarily skilled artisan the invention as set forth in claims 5 through 9. Accordingly, we reverse the Examiner’s rejection of claims 5 through 9.

II. Under 35 U.S.C. § 103, is the Rejection of Claims 10 through 16 as being unpatentable over Farnung, taken alone, or in Various Combinations with Kishida, Hieda or Ishikawa Proper?

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). *See also In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of

ordinary skill in the art suggests the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444. *See also Piasecki*, 745 F.2d at 1472, 223 USPQ at 788. Thus, the examiner must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the examiner's conclusion. However, a suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 987-88, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) citing *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). *See also In re Thrift*, 298 F.3d 1357, 1363, 63 USPQ2d 2002, 2008 (Fed. Cir. 2002).

An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. “In reviewing the [E]xaminer’s decision on appeal, the Board must necessarily weigh all of the evidence and argument.” *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444. “[T]he Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency’s conclusion.” *In re Lee*, 277 F.3d 1338, 1344, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002).

Appellant argues that Farnung does not teach limitations of dependent claims 10 and 11 because of their dependency on claim 5. Particularly, Farnung does not teach modifying the color component of the pixel if the pixel value falls outside the lower and upper offset points on the reproduction curve. We have already addressed this argument in the discussion of claims 5 through 9 above, and we agree with Appellant.

Regarding claims 12 through 16, Appellant asserts that Farnung does not teach modifying mid-range values by interpolating between light and dark areas of the image to blend the transitions between these areas when the pixel component values fall between the lower and upper ends of the threshold. Appellant further argues that neither Kishida nor Hieda nor

Ishikawa teaches such modification of mid-range value by interpolation. We agree.

We find that the cited references are cumulative to Farnung. Kishida, for example, teaches taking a weighted average of respective reference tone values to obtain a modified reproduction curve. In addition, Hieda discloses a gamma correction circuit that uses a reference signal to correct an output signal. The ordinarily skilled artisan would have readily recognized that these teachings, taken alone or in various combinations, do not amount to interpolating image data to blend transitions between light and dark areas of the image. Ishikawa, unfortunately, does not remedy such deficiencies.

After considering the entire record before us, we conclude that the evidence relied upon and the level of skill in the particular art would not have suggested to the ordinarily skilled artisan the invention as set forth in claims 10 through 16. Accordingly, we reverse the Examiner's rejection of claims 10 through 16.

III. Under 35 U.S.C. § 103, is the Rejection of Claims 1 through 4, 17 and 18 as being unpatentable over Various Combination of Sugimoto, Wu and Hieda Proper?

Appellant argues that the various combinations of Sugimoto, Wu and Hieda do not render claims 1 through 4, 17 and 18 obvious. Particularly, the

the various combinations fail to teach the limitation of blending transition between pixels in the image. We agree.




Sugimoto, like Hieda, discloses a gamma correction circuit that uses a reference signal to correct an output signal. In addition, Wu discloses a pixel adaptive noise reduction filter for filtering a current pixel in a digital video signal. The ordinarily skilled artisan would have readily recognized that these teachings, taken alone or in various combinations, do not amount to blending transition between pixels in the image.

After considering the entire record before us, we conclude that the evidence relied upon and the level of skill in the particular art would not have suggested to the ordinarily skilled artisan the invention as set forth in claims 1 through 4, 17 and 18. Accordingly, we reverse the Examiner's rejection of claims 1 through 4, 17 and 18.

CONCLUSION

In view of the foregoing discussion, we have reversed the Examiner's rejection of claims 5 through 9 under 35 U.S.C. § 102. We have also reversed the Examiner's rejection of claims 1 through 4 and 10 through 18 under 35 U.S.C. § 103.

REVERSED

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JOSEPH F. RUGGIERO)	
Administrative Patent Judge)	
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)	BOARD OF
ALLEN R. MACDONALD)	PATENT
Administrative Patent Judge)	APPEALS AND
)	
)	INTERFERENCES
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